

What is claimed is:

1. A plasma processing method, comprising the steps of:  
supplying a processing gas into an airtight processing  
5 chamber, plasmizing the processing gas, and plasma-  
processing a target layer formed on an object to be  
processed by using a resist film as a mask,

wherein the plasma-processing is conducted while a  
process condition being changed on the basis of a variation  
10 of a thickness reduction rate of the resist film.

2. The plasma processing method of claim 1, wherein the  
plasma-processing step includes:

a first process of plasma-processing the target layer  
15 while the thickness of the resist film being monitored until  
the thickness reduction rate of the resist film reaches a  
predetermined value; and

a second process of plasma-processing the target layer  
under a changed process condition in which selectivity  
20 against the resist film is higher than in the first process.

3. The plasma processing method of claim 2, wherein the  
target layer includes an oxide layer containing silicon, the  
first process is conducted by using a processing gas  
25 containing a CF-based gas, and the second process is  
conducted by using a processing gas containing a CHF-based

gas.

4. The plasma processing method of claim 2, wherein the second process is conducted under a process condition by using a processing gas containing components reduced in the chamber during the first process.

5. The plasma processing method of claim 4, wherein the target layer includes an oxide layer containing silicon, the first process is conducted by using a processing gas containing a CF-based gas, and the second process is conducted by using a processing gas containing a CO<sub>x</sub> gas.

6. The plasma processing method of claim 2, wherein the thickness of the resist film is observed by detecting interference waves of rays reflected from the resist film in the first process.